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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/525,423

10/11/2005

Gary Kovacik

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EXAMINER

DAM, DUSTIN Q

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

03/18/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/525,423	Applicant(s) KOVACIK ET AL.	
	Examiner DUSTIN Q. DAM	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/27/2005 & 2/23/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Summary

1. This is the initial Office Action based on the Thermophotovoltaic Device filed on August 22, 2003.
2. Claims 1-6 are currently pending and have been fully considered.

Specification

3. The disclosure is objected to because of the following informalities: Line 30 of page one in the specification filed on February 23, 2005 recites, "This makes the thermophotovoltaic cells may efficient." It is construed that applicant intended to state "more" efficient. Appropriate correction is required.

Claim Objections

4. Claims 4 and 5 are objected to because of the following informalities: Claim 4 recites, "The thermophotovoltaic device as defined in Claim 4..." It is construed that applicant intended to state the limitations of claim 4 to be dependent on claim 3. This interpretation of claim 4 to depend on claim 3 rather than improperly depend on claim 4 is used in its consideration in this Office Action. Claim 5 is subsequently objected to for dependency on claim 4. Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1 and 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over GOLDSTEIN et al. (U.S. Patent 4,906,178) in view of BOLGER (U.S. Patent 5,625,485).

a. With regards to claim 1, GOLDSTEIN et al. discloses a thermophotovoltaic device having an energy source (36, FIG. 3) compatible with thermophotovoltaic cells and thermophotovoltaic cells (43, FIG. 3) comprising a filter (47, FIG. 3) adapted to filter out long wavelength energy (line 6-16, column 5) positioned between the energy source and the thermophotovoltaic cells (line 6—64, column 4), the filter having dual walls (47, FIG. 3 & see line 61-64, column 4) with a low conductivity space (FIG. 3 shows space between walls of filter 47 with flowing air) between the walls which is adapted to break the convection heat transfer path (via “cooling air” line 64-68, column 4) from the energy source to the thermophotovoltaic cells.

GOLDSTEIN et al. does not appear to explicitly disclose a thermophotovoltaic device wherein the low conductivity space that is adapted to break convection heat is evacuated under a vacuum.

However, BOLGER discloses an optical filter and discloses, in a thermophotovoltaic application, a method of breaking the convection heat from the energy source to the thermophotovoltaic cells. In FIG. 3, BOLGER discloses an energy source (110), thermophotovoltaic cells (120), and an optical filter (100) in between. BOLGER discloses to "suppress convection" the region between the thermophotovoltaic cells and the energy source is evacuated (line 20-23, column 3).

Thus, at the time of the invention, it would have been obvious to a person having ordinary skill in the art to substitute the means for breaking convection heat between the energy source and the thermophotovoltaic cells which is to flow air through the low conductivity space in the thermophotovoltaic device, as disclosed by GOLDSTEIN et al., with the means disclosed by BOLGER which is to evacuate the space between the energy source and thermophotovoltaic cells, because the substitution of a vacuum in the low conductivity space would yield the predictable results of breaking the convection heat of the energy source to the thermophotovoltaic cells.

b. With regards to claim 3, independent claim 1 is obvious over GOLDSTEIN et al. in view of BOLGER under 35 U.S.C. 103(a) as discussed above. The combination of GOLDSTEIN et al. and BOLGER discloses a thermophotovoltaic device comprising a filter with dual walls. GOLDSTEIN et al. discloses the dual walls are of heat resistant glass (47, FIG. 3 & see line 61-64, column 4 "quartz")

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- c. With regards to claim 4, independent claim 1 and dependent claim 3 is obvious over GOLDSTEIN et al. in view of BOLGER under 35 U.S.C. 103(a) as discussed above. The combination of GOLDSTEIN et al. and BOLGER discloses a thermophotovoltaic device comprising a filter with dual walls. GOLDSTEIN et al. discloses the heat resistant glass is quartz (47, FIG. 3 & see line 61-64, column 4 "quartz")
- d. With regards to claim 5, independent claim 1 and dependent claim 4 is obvious over GOLDSTEIN et al. in view of BOLGER under 35 U.S.C. 103(a) as discussed above. The combination of GOLDSTEIN et al. and BOLGER discloses a thermophotovoltaic device comprising a filter with dual walls. GOLDSTEIN et al. discloses the dual arranged as concentric tubes (47, FIG. 3 & see line 61-64, column 4 "concentric quartz or glass tubes")
- e. With regards to claim 6, independent claim 1 is obvious over GOLDSTEIN et al. in view of BOLGER under 35 U.S.C. 103(a) as discussed above. The combination of GOLDSTEIN et al. and BOLGER discloses a thermophotovoltaic device comprising an energy source. GOLDSTEIN discloses an energy source being a burner with an emitter (36, FIG. 3 & see 2nd – 3rd sentence, ABSTRACT).
8. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over GOLDSTEIN et al. (U.S. Patent 4,906,178) in view of BOLGER (U.S. Patent 5,625,485), as applied to claims 1, and 3-6, in further view of FRAAS et al. (U.S. Patent 6,284,969 B1).
- a. Independent claim 1 is obvious over GOLDSTEIN et al. in view of BOLGER under 35 U.S.C. 103(a) as discussed above. The combination of GOLDSTEIN et al. and

BOLGER discloses a thermophotovoltaic device comprising an energy source and thermophotovoltaic cells.

The combination of GOLDSTEIN et al. and BOLGER does not appear to explicitly disclose a thermophotovoltaic device further comprising a dielectric filter adapted to filter mid-wavelength energy positioned between the energy source and the thermophotovoltaic cells.

However, FRAAS et al. discloses a thermophotovoltaic device and discloses a dielectric filter (line 26-28, column 4) adapted to filter mid-wavelength energy positioned between the energy source and the thermophotovoltaic device (line 15-17, column 2 “positioned on each cell” which is inherently between the cell and the energy source). FRAAS et al. discloses that usable wavelengths are less than 2 microns and the dielectric filter is good from 2-4 microns (line 26-28, column 4). It is known in the art that unusable wavelengths add unwanted heat to the cells.

Thus, at the time of the invention, it would have been obvious to a person having ordinary skill in the art to modify the thermophotovoltaic device, as disclosed by the combination of GOLDSTEIN et al. and BOLGER, to include a dielectric filter between the energy source and the cells, as disclosed by FRAAS et al., because filtering out mid-wavelength energy as disclosed would avoid unusable energy adding unwanted heat to the thermophotovoltaic cell.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DUSTIN Q. DAM whose telephone number is (571)270-5120. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571)272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit
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March 6, 2008